

APPENDIX: CLAIMS ON APPEAL

1. A semiconductor structure comprising:

an electrically conductive interconnect disposed within a first dielectric layer, said electrically conductive interconnect having an upper surface and comprising a metal;

a passivation layer upon said upper surface, said passivation layer comprising the chemical structure M-N-H_x, where M represents the metal of the interconnect; and

an interlayer dielectric upon said first dielectric layer and upon said upper surface, said interlayer dielectric being continuously adhered to said upper surface; wherein the passivation layer substantially covers the upper surface of the interconnect in order to chemically protect about 1-1,000 atomic lattice layers thereof.

2. A semiconductor structure according to claim 1, wherein said electrically conductive interconnect further comprises:

a first titanium liner layer disposed within a depression in said first dielectric layer;

a first titanium nitride layer disposed upon said first titanium liner layer; and

a tungsten film disposed upon said first titanium nitride layer and filling said depression.

7. A semiconductor structure comprising:

an electrically conductive interconnect having an upper surface and being disposed within a dielectric layer, said electrically conductive interconnect including:

a titanium liner layer disposed within a depression in said dielectric layer;

a titanium nitride layer disposed upon said titanium liner layer; and

a tungsten film disposed upon said titanium nitride layer and filling said depression;

a first passivation layer comprising a tungsten nitride compound and being disposed upon said upper surface;

a second passivation layer comprising multiple layers of nitrogen compounds adsorbed upon said first passivation layer according to Brunauer's Type V adsorption; and

an interlayer dielectric disposed upon said dielectric layer and upon said upper surface, said interlayer dielectric being continuously adhered to said upper surface; wherein the first and second passivation layers substantially cover the upper surface of the interconnect in order to chemically protect about 1-1,000 atomic lattice layers thereof.

8. A semiconductor structure comprising:

an electrically conductive interconnect disposed within a dielectric layer, said electrically conductive interconnect having an upper surface and including:

a titanium liner layer disposed within a depression in said dielectric layer;

a titanium nitride layer disposed upon said titanium liner layer; and

a tungsten film disposed upon said titanium nitride layer and filling said depression;

a passivation layer upon said upper surface and comprising nitrogen adsorbed upon said upper surface according to Brunauer's Type V adsorption; and

an interlayer dielectric upon said dielectric layer and upon said upper surface, said interlayer dielectric being continuously adhered to said upper surface; wherein the passivation layer substantially covers the upper surface of the interconnect in order to chemically protect about 1-1,000 atomic lattice layers thereof.

9. An interconnect in an electronic device comprising:

a metallic first structure disposed within a first silicon oxide layer, said metallic first structure having an upper surface;

a passivation layer upon said upper surface, said passivation layer formed by exposing said upper surface to a plasma consisting essentially of a nitrogen-containing silane; and

a second silicon oxide layer disposed upon said first silicon oxide layer and upon said upper surface, said second silicon oxide layer being continuously adhered to said upper surface;

wherein the passivation layer substantially covers the upper surface of the metallic first structure in order to chemically protect about 1-1,000 atomic lattice layers thereof.

10. An interconnect in an electronic device according to claim 9, wherein said metallic first structure further comprises:

a titanium liner layer disposed within an interconnect corridor in said first silicon oxide layer;

a titanium nitride layer disposed upon said titanium liner layer; and

a tungsten film disposed upon said titanium nitride layer.

15. An interconnect in an electronic device comprising:

a metallic structure disposed within a first silicon oxide layer, said metallic structure having an upper surface and including:

 a titanium liner layer disposed within an interconnect corridor in said first silicon oxide layer;

 a titanium nitride layer disposed upon said titanium liner layer; and

 a tungsten film disposed upon said titanium nitride layer;

 a first passivation layer disposed upon said upper surface and comprised of a tungsten nitride compound;

 a second passivation layer comprising nitrogen disposed upon said first passivation layer; and

 a second silicon oxide layer disposed upon said first silicon oxide layer and upon said upper surface, said second silicon oxide layer being continuously adhered to said upper surface;

wherein the first and second passivation layers substantially cover the upper surface of the interconnect in order to chemically protect about 1-1,000 atomic lattice layers thereof.

16. An interconnect in an electronic device comprising:

a metallic structure disposed within a first silicon oxide layer, said metallic structure having an upper surface and including:

 a titanium liner layer disposed within an interconnect corridor in said first silicon oxide layer;

a titanium nitride layer disposed upon said titanium liner layer; and
a tungsten film disposed upon said titanium nitride layer;
a passivation layer disposed upon said upper surface and formed by exposing said upper surface to a plasma consisting essentially of a nitrogen-containing silane; and
a second silicon oxide layer disposed upon said first silicon oxide layer and upon said upper surface, said second silicon oxide layer being continuously adhered to said upper surface;
wherein the passivation layer substantially covers the upper surface of the metallic structure in order to chemically protect about 1-1,000 atomic lattice layers thereof.

17. A semiconductor structure comprising:

an electrically conductive interconnect disposed within a first dielectric layer, said electrically conductive interconnect having an upper surface;
a first passivation layer disposed upon said upper surface, said first passivation layer comprising a tungsten nitride compound;
a second passivation layer comprising multiple layers of nitrogen compounds adsorbed upon said first passivation layer according to Brunauer's Type V adsorption; and
an interlayer dielectric disposed upon said first dielectric layer and upon said upper surface, said interlayer dielectric being continuously adhered to said upper surface; wherein the first and second passivation layers substantially cover the upper surface of the interconnect in order to chemically protect about 1-1,000 atomic lattice layers thereof.

18. A semiconductor structure according to claim 17, wherein said first passivation layer has a thickness of less than about 50 Å.

19. An interconnect in an electronic device comprising:

a metallic first structure disposed within a first silicon oxide layer, said metallic first structure having an upper surface;

a first passivation layer disposed upon said upper surface, said first passivation layer comprising a tungsten nitride compound;

a second passivation layer comprising multiple layers of nitrogen compounds adsorbed upon said first passivation layer according to Brunauer's Type V adsorption; and

a second silicon oxide layer disposed upon said first silicon oxide layer and upon said upper surface, said second silicon oxide layer being continuously adhered to said upper surface;

wherein the first and second passivation layers substantially cover the upper surface of the interconnect in order to chemically protect about 1-1,000 atomic lattice layers thereof.

20. An interconnect according to claim 19, wherein said first passivation layer has a thickness of less than about 50 Å.

29. A semiconductor structure comprising:

an electrically conductive interconnect disposed within a first dielectric layer, said electrically conductive interconnect having an upper surface;

a passivation layer disposed upon said upper surface, said passivation layer comprising nitrogen; and

an interlayer dielectric disposed upon said first dielectric layer and upon said upper surface, said interlayer dielectric being continuously adhered to said upper surface; wherein the passivation layer substantially covers the upper surface of the interconnect in order to chemically protect about 1-1,000 atomic lattice layers thereof.

30. A semiconductor structure comprising:

an electrically conductive interconnect disposed within a first dielectric layer, said electrically conductive interconnect having an upper surface;

a first passivation layer upon said upper surface, said first passivation layer comprising a tungsten nitride compound;

a second passivation layer upon said first passivation layer, said second passivation layer comprising nitrogen; and

an interlayer dielectric disposed upon said first dielectric layer and upon said upper surface, said interlayer dielectric being continuously adhered to said upper surface; wherein the first and second passivation layers substantially cover the upper surface of the interconnect in order to chemically protect about 1-1,000 atomic lattice layers thereof.